



Research Brief for Resource Managers

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Contact:

Marc Meyer

Phone:

559-297-0706 ext. 4929

Email:

mdmeyer@fs.fed.us

Sierra Nevada Fire Science Delivery Consortium | One Shields Avenue, Davis, CA 95616

Resource Objective Wildfires Benefit Forests

Meyer, Marc D. 2015. Forest Fire Severity Patterns of Resource Objective Wildfires in the Southern Sierra Nevada. *Journal of Forestry* 113(1): 49-56.

<http://www.ingentaconnect.com/content/saf/jof/2015/00000113/00000001/art00008>

Large wildfires managed for resource objectives have the potential to vastly increase the scale of ecological benefits to forest landscapes adapted to frequent fire. However, distinguishing favorable versus undesirable outcomes of wildland fires within an objective framework is challenging. A 2015 study by Meyer showed that the natural range of variation (NRV) concept and key fire severity indicators could be used to quantitatively evaluate the landscape-scale effects of large wildfires managed for resource objectives.

The author compared the NRV in several fire severity indicators (i.e., fire severity proportions, mean and maximum high-severity patch size) with patterns observed from 17 large wildfires that burned over 95,000 acres in the southern Sierra Nevada. This analysis focused on national forest lands in the region but also included more than 64,000 acres that burned across Forest Service and National Park Service administrative boundaries. The author incorporated information from historic, contemporary reference, and modeled sources to define the NRV in mid-elevation coniferous forests of the region. This unique combination of historic and contemporary reference data to define the NRV represents a relatively new application of a thoroughly-tested concept currently supported by Forest Service planning efforts.

Management Implications

- Wildfires burning in suitable weather and terrain provide unique opportunities to restore and maintain the resilience of forest ecosystems in large landscapes.
- In the national forests of the southern Sierra Nevada, 17 wildfires between 1,000 and 20,000 acres in size have been successfully managed for natural resource objectives, despite decades of fire exclusion in these topographically complex, fire-adapted forest landscapes.
- Wildfires managed for resource objectives are ideally suited to large wilderness or inventoried roadless areas but may also include self-contained "firedheds" outside the wildland urban interface.



Wildfires managed for resource objectives may provide large-scale ecological benefits to forest landscapes, as shown in this image of the 2011 Lion Fire on the Sequoia National Forest. *Image Credit: Inciweb.*

Virtually all wildfires managed for resource objectives in the national forests of the southern Sierra Nevada were within the NRV with respect to fire severity indicators. These patterns were relatively consistent across a range of large wildfire sizes (1,000 to 20,700 acres) and mid-elevation forest types in the region, although larger wildfires tended to produce larger maximum high-severity patches. Only the largest resource objective wildfire in the study (2011 Lion Fire) had a single maximum high-severity patch size that approached the upper NRV value.

The author suggests that the NRV approach could provide managers with an initial evaluation of fire effects in forest landscapes, although there are several inherent conceptual and practical limitations. Additional approaches and indicators (e.g., air quality, watershed condition) could be used with the NRV approach to provide a more comprehensive examination of the potential effects of large, resource objective wildfires.

Greater flexibility may be warranted for the reintroduction of fire into fire-adapted forest landscapes of the western United States. The use of “demonstration firesheds,” especially in remote fire-adapted landscapes, could strengthen interagency partnerships, build stakeholder support, create new contemporary reference landscapes, and enhance the scale of forest restoration efforts throughout the region.

Additional references for this topic:

Collins, B.M., and S.L. Stephens. 2007. Managing natural wildfires in Sierra Nevada wilderness areas. *Front. Ecol. Environ.* 5(10): 523–527.

North, M., B. Collins, and S. Stephens. 2012. Using fire to increase the scale, benefits, and future maintenance of fuels treatments. *J. For.* 110:392–401.

Van Wagendonk, J.W., and J.A. Lutz. 2007. Fire regime attributes of wildland fires in Yosemite National Park, USA. *Fire Ecol.* 3(2):34–52.



Contemporary reference landscapes or “demonstration firesheds”, such as the Sugarloaf Basin in Sequoia and Kings Canyon National Parks (top) and Sierra San Pedro Mártir in northern Baja California, Mexico (bottom) represent examples of fire-adapted, resilient forest landscapes where natural fire regimes have been restored or maintained for many decades. These reference landscapes are invaluable in the evaluation of resource objective wildfires in the national forests of the southern Sierra Nevada. *Image Credit: Marc Meyer, USFS.*